



1.

An apparatus for retrieving a broken, down-hole bit having a cutting end comprising:

a hollow, generally cylindrical inner retainer sleeve having a first collar and a second collar positioned at opposite ends of said inner retainer sleeve;

a holding band attached to and circumventing said bit;

a retaining ring attached to and circumventing said bit, said retaining ring positioned closer to said cutting end than said holding band is positioned;

said inner retainer sleeve having a larger inner radius than the outer radiuses of said retaining ring and said holding band;

said first collar having a smaller inner radius than the outer radius of said retaining ring;

said second collar having a smaller inner radius than the outer radius of said holding band;

said inner retainer sleeve positionable around said bit with said first collar below said retaining ring and said second collar above said holding band;

a hollow, generally cylindrical outer protective sleeve having a rim positioned at one end of said outer protective sleeve;

said outer protective sleeve having a larger inner radius than the outer radius of said inner retainer sleeve;

said rim having a smaller inner radius than the outer radius of said holding band; and

said outer protective sleeve generally position positioned around said inner retainer sleeve.

2.

The apparatus of Claim 1, wherein said inner retainer sleeve is further comprised of a first inner sleeve piece and a second inner sleeve piece.

3. The apparatus of Claim 1, wherein said inner retainer sleeve is further comprised of at least three inner sleeve pieces.
4. An apparatus for retrieving a broken, down-hole bit having a cutting end comprising:
 - a hollow, generally cylindrical inner retainer sleeve having a collar and a knob positioned at opposite ends of said inner retainer sleeve;
 - a holding band attached to and circumscribing said bit;
 - a first retaining ring attached to and circumscribing said bit, said first retaining ring positioned closer to said cutting end than said holding band is positioned, and said first retaining ring having a first slot;
 - a second retaining ring attached to and circumscribing said bit, said second retaining ring positioned closer to said cutting end than said holding band is positioned, and said second retaining ring having a second slot;
 - said inner retainer sleeve having a larger inner radius than the outer radiuses of said first and second retaining rings and said holding band;
 - said collar having a smaller inner radius than the outer radius of said holding band;
 - said knob having a smaller inner radius than the outer radius of said first and second retaining rings;
 - said knob sized to fit through said first and second slots; and
 - said inner retainer sleeve attachable around said bit with said knob below said first and second retaining rings and said second collar above said holding band.
5. The apparatus of Claim 4, wherein said first and second slots are offset.
6. The apparatus of Claim 4, further comprising a blocking member attachable within said first or second slots.

7. The apparatus of Claim 4, further comprising
a hollow, generally cylindrical outer protective sleeve having a rim positioned at one end
of said outer protective sleeve;
said outer protective sleeve having a larger inner radius than the outer radius of said inner
retainer sleeve;
said rim having a smaller inner radius than the outer radius of said holding band; and
said outer protective sleeve generally position positioned around said inner retainer
sleeve.
8. The apparatus of Claim 5, further comprising
a hollow, generally cylindrical outer protective sleeve having a rim positioned at one end
of said outer protective sleeve;
said outer protective sleeve having a larger inner radius than the outer radius of said inner
retainer sleeve;
said rim having a smaller inner radius than the outer radius of said holding band; and
said outer protective sleeve generally position positioned around said inner retainer
sleeve.
9. The apparatus of Claim 6, further comprising
a hollow, generally cylindrical outer protective sleeve having a rim positioned at one end
of said outer protective sleeve;
said outer protective sleeve having a larger inner radius than the outer radius of said inner
retainer sleeve;
said rim having a smaller inner radius than the outer radius of said holding band; and

said outer protective sleeve generally position positioned around said inner retainer sleeve.